

Electron hot-spots in the ionospheric troughs

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Swarm Langmuir probe data show hot-spots with electron temperatures exceeding 5000 K at 500 km altitude in both the mid- and high-latitude troughs in the night. The cause of the high temperature can neither be solar UV nor soft particle precipitation. The latter would also lead to some ionization, inconsistent with the observed very low electron densities. In a thirty year old theoretical study by Schunk et al. (1986) heat flow from the magnetosphere was identified to be the cause of the electron hot-spots. The simulated spatial distribution of the high T_e spots is remarkably similar to the observations with Swarm. We also look for incoherent scatter data to get complete altitude profiles of the density and temperature in the hot spots.